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Inhalt/Contents

Andersen, N., Jensen, K., Veje, E., Nielsen, O.: An Optical Study of the Li^+-He Collision from 2 to 75 keV 349
Anderson, R. W., Phillips, R. L.: Electrical Conductance Time Constants for Freely Decaying Arcs 1
Arenhövel, H., s. Reinhard, P. G. 211
Arnold, P., s. Dilg, W., *et al.* 427
Bambynek, W., Reher, D.: Accurate Determination of the $P_K \omega_K$ Value and the Fluorescence Yield ω_K of Sr after Electron Capture Decay of ^{88}Y 253
Bennemann, K. H., s. Kerker, G. 15
Bessenrodt, R.: Grundlagen einer nichtlinearen Stabilitätstheorie der stationären Zustände isothermer elektrischer Netzwerke 171
Beuscher, H., s. Davidson, W. F., *et al.* 235
Brecht, J., Kowalski, J., Lidö, G., Ma, I.-J., Putlitz, G. zu: Lifetimes and g_J Factors of $6s\,7p$ and $5d\,6p$ Levels of Ba I 273
Breuer, G., Müller, D.: A Study of Branching Ratios of Cross Sections in the Charge Symmetric Reactions $^{10}B(d, p)^{11}B$ and $^{10}B(d, n)^{11}C$ 201
Bukow, H. H., s. Heckmann, P. H., *et al.* 109
Bukow, H. H., s. Tielert, R., *et al.* 119, 129
Buttlar, H. v., s. Tielert, R., *et al.* 129
Davidson, W. F., Lieder, R. M., Beuscher, H., Neskakis, A., Seres, Z., Mayer-Böricke, C.: Observation of Back- and Forwardbending in the ^{182}Os Ground-State Band 235
Demchenko, V. V., El-Naggar, I. A., Hussein, A. M.: To the Theory of Nonlinear Mode Coupling in Dynamic Stabilization of MHD Modes 85
Dilg, W., Mannhart, W., Steichele, E., Arnold, P.: Precision Neutron Total Cross Section Measurements on Gold and Cobalt in the 40 μeV–5 meV Range . . 427
Ebenhöh, H., Eisele, F., Filthuth, H., Hepp, V., Leitner, E., Thouw, T., Zech, G.: Measurement of Radiative $\Sigma\pm \to n\pi\pm\gamma$ Decay 413
Eisele, F., s. Ebenhöh, H., *et al.* 413
El-Naggar, I. A., s. Demchenko, V. V., *et al.* 85
Elsner, J., s. Franck, G. 39
Entel, P., s. Klose, W., *et al.* 51
Etten, M. P., Thornton, S. T.: Investigation of States in ^{17}F by the $^{15}N(^3He, n)^{17}F$ Reaction 187
Figger, H., Wolber, G.: Precision Measurement of the Hyperfine Structure of Lu^{175} with the Atomic Beam Magnetic Resonance Method 95
Filthuth, H., s. Ebenhöh, H., *et al.* 413
Franck, G., Elsner, J.: Isotopic Effects in the Establishment of Thermal Equilibrium of Stationary H_2- and D_2-Glow Plasmas 39
Freund, F.: Innere Konversion der 161 keV- und 223 keV-Übergänge in ^{133}Cs 259
Grassberger, P.: Corrections to Weinberg's Pion-Pion Scattering Lengths . . . 241
Griffioen, R. D., s. Zaitz, J. I., *et al.* 227
Guenther, P. T., s. Smith, A. B., *et al.* 379
Hauser, U., s. Kuhn, P., *et al.* 287
Heckmann, P. H., Bukow, H. H., Tielert, R.: Relative Anfangsbesetzungszahlen der Zustände $2p$ und $3d$ folienangeregter Wasserstoffatome 109
Heckmann, P. H., s. Tielert, R., *et al.* 129

Hepp, V., s. Ebenhöh, H., *et al.* 413
Herziger, G., Lüthi, H. R., Seelig, W.: Temperaturen in Ionenlaserplasmen 61
Hietel, B., Mayer, H.: Zur Abhängigkeit der optischen Eigenschaften des Natriums von Temperatur und Aggregatzustand im Wellenlängenbereich von 0,3 bis 2,5 μm 21
Hillebrandt, W.: On the Stability of Neutron Matter Calculations 321
Hussein, A. M., s. Demchenko, V. V., *et al.* 85
Jensen, K., s. Andersen, N., *et al.* 349
Kaufmann, E. N., s. Waard, H. de, *et al.* 423
Kerker, G., Bennemann, K. H.: Theory for Superconductivity in Amorphous Transition Metals 15
Kleber, R.: On the Electronic Density of States of the Transition Metals. IV. The Superposition Model 301
Kleber, R.: On the Electronic Density of States of the Transition Metals. V. The Alloy System Ni-Rh 309
Klose, W., Entel, P., Peter, M.: Elektron-Elektron-Wechselwirkung in kompensierten Ultrahochfeldsupraleitern 51
Koepke, R.: Zum Hall-Effekt abschreckend kondensierter Metallschichten . . . 155
Kowalski, J., s. Brecht, J., *et al.* 273
Kuhn, P., Hauser, U., Neuwirth, W.: Mössbauer Investigations of Intermolecular Interactions of $Fe(CO)_5$ in Frozen Organic Solutions 287
Leitner, E., s. Ebenhöh, H., *et al.* 413
Lidö, G., s. Brecht, J., *et al.* 273
Lieder, R. M., s. Davidson, W. F., *et al.* 235
Lüthi, H. R., s. Herziger, G., *et al.* 61
Ma, I.-J., s. Brecht, J., *et al.* 273
Mannhart, W., s. Dilg, W., *et al.* 427
Mantzouranis, G.: Direct and Compound Contributions to (n, γ) Cross Sections 405
Mayer, H., s. Hietel, B. 21
Mayer-Böricke, C., s. Davidson, W. F., *et al.* 235
Müller, D., s. Breuer, G. 201
Nakel, W., Pankau, E.: Eine Koinzidenzmessung zum Elementarprozeß der Elektron-Elektron-Bremsstrahlung bei 300 keV 139
Neskakis, A., s. Davidson, W. F., *et al.* 235
Neuwirth, W., s. Kuhn, P., *et al.* 287
Nielsen, O., s. Andersen, N., *et al.* 349
Pankau, E., s. Nakel, W. 139
Park, J. Y.: Shell-Model Analysis of Helion and Triton Inelastic Scattering from ^{90}Zr Including Core Polarization Effects 355
Peter, M., s. Klose, W., *et al.* 51
Phillips, R. L., s. Anderson, R. W. 1
Putlitz, G. zu, s. Brecht, J., *et al.* 273
Reher, D., s. Bambynek, W. 253
Reinhard, P. G., Arenhövel, H.: Effect of Three-Body Cluster on the Healing Properties of the Jastrow Correlation Function 211
Rodgers, J. W., s. Waard, H. de, *et al.* 423
Schalch, D., Scharmann, A.: The Influence of the Channeling Effect on the Luminescence of NaCl Single Crystals under Ion Bombardment 73
Scharmann, A., s. Schalch, D. 73
Seelig, W., s. Herziger, G., *et al.* 61
Seres, Z., s. Davidson, W. F., *et al.* 235
Sheline, R. K., s. Zaitz, J. I., *et al.* 227

Smith, A. B., Guenther, P. T., Whalen, J. F.: Neutron Total and Scattering Cross Sections of Niobium in the Continuum Region 379
Steichele, E., s. Dilg, W., *et al.* 427
Stenflo, L., s. Yu, M. Y., *et al.* 341
Stępień-Rudzka, W., s. Zielińska-Pfabé, M. 399
Tegeback, R., s. Yu, M. Y., *et al.* 341
Thornton, S. T., s. Etten, M. P. 187
Thouw, T., s. Ebenhöh, H., *et al.* 413
Tielert, R., Bukow, H. H.: Einbeziehung von Kaskaden bei der Ionenstrahlspektroskopie des Wasserstoffs durch korrelierte Analyse zweier Linien 119
Tielert, R., Bukow, H. H., Heckmann, P. H., Woodruff, R., Buttlar, H. v.: Ionenstrahlspektroskopie mit Wasserstoffionen als Primärteilchen 129
Tielert, R., s. Heckmann, P. H., *et al.* 109
Veje, E., s. Andersen, N., *et al.* 349
Waard, H. de, Kaufmann, E. N., Rodgers, J. W.: Perturbed Angular Correlation Measurement of the g-Factor of the 668 keV State in ^{132}Xe 423
Wehrum, R. P.: On the Existence of Higher Waves in a Layer of Superfluid Helium 331
Whalen, J. F., s. Smith, A. B., *et al.* 379
Wolber, G., s. Figger, H. 95
Woodruff, R., s. Tielert, R., *et al.* 129
Yu, M. Y., Tegeback, R., Stenflo, L.: On Test Charge Potentials in Collisional Plasmas 341
Zaitz, J. I., Sheline, R. K., Griffioen, R. D.: Energy Levels of ^{175}Hf 227
Zech, G., s. Ebenhöh, H., *et al.* 413
Zielińska-Pfabé, M., Stępień-Rudzka, W.: Influence of the Quadrupole-Pairing Interaction on the $J\pi=0^+$ Vibrations in the Pt Region 399
Erratum to Wortmann, G.: Einfluß eines über s-d-Austausch angekoppelten Leitungsbandes auf einen Heisenberg-Ferromagneten Z. Physik **256**, 332–348 (1972) 354

Indexed in Current Contents

Zeitschrift für Physik

Neu eingegangene Arbeiten

H. Röpke, G. Hammel, W. Brendler, P. Betz, and V. Glattes, Fakultät für Physik der Universität Freiburg, Freiburg i. Br., W. Germany:

New Aspects of the Rotational Model in $^{25}Mg^{+}$

Spin assignments have been made to the ^{25}Mg levels in the $E_x = 5$–6 MeV region from γ-ray angular distributions measured in the $^{22}Ne(\alpha, n\gamma)$ reaction at $E_\alpha = 8.0$ and 8.8 MeV and from p-γ angular correlations measured in the $^{24}Mg(d, p\gamma)$ reaction at $E_d = 6$ MeV. Unique spin assignments of $J = 7/2$, 5/2, 5/2, and 9/2 could be made to the levels at $E_x = 5005$, 5511, 5851, and 5967 keV, respectively. Ambigious assignments have been made to the levels at $E_x = 5245$, 5524, 5785, 6032 keV ($J = 11/2$, 7/2), 5455 keV ($J = 13/2$, 9/2), and 5738 keV ($J = 3/2$, 5/2). The present data confirm previous assignments of $J = 1/2$ to the levels at $E_x = 5108$ and 5466 keV, respectively. Lifetime estimates have been obtained, using the Doppler-shift attenuation method, for the levels at $E_x = 5245$ keV ($\tau = 30$–60 fs), 5785 keV ($\tau = 50$–100 fs), 5967 keV ($\tau = 50$–100 fs), and 5455 keV ($\tau > 1$ ps). All other levels in the $E_x = 5-6$ MeV region have $\tau < 60$ fs. A breakdown of the K-selection rule has been observed in the γ-decay of some high spin states, indicating a deviation from the strong coupling model.

F. W. Kleinlein und R. Helbig, Institut für Angewandte Physik, Erlangen:

Diffusionskonstante und charakteristische Absorption vor der Bandkante von Mn in ZnO-Kristallen

ZnO single crystals were doped with Mn and Co by diffusion. In the temperature range from 1400–1600 K the Mn and Co-diffusion-constants were determined:

$$D_{Mn} = 3.2 \cdot 10^{-3} \exp\left(-\frac{2.87\,eV}{kT}\right) cm^2\,sec^{-1}$$

and

$$D_{Co} = 1.10 \exp\left(-\frac{3.98\,eV}{kT}\right) cm^2\,sec^{-1}.$$

The Mn doped ZnO crystals show a characteristic colour due to an absorption near the intrinsic absorption edge. The corresponding absorption spectra were measured for $E \perp c$ and $E \| c$. A discussion of different absorption mechanism shows that a charge-tansfer transition is responsible for this absorption.

H. M. Schüpferling and K.-W. Hoffmann, Institut für Strahlenphysik der Universität Stuttgart:

Formfaktor des Betaspektrums von ^{146}Pm (Shape Factor of the Beta Spectrum of ^{146}Pm)

The β-spectrum of the $3^- - 2^+$ transition in the decay of ^{146}Pm has been investigated with a 4π-Si (Li)-semiconductor spectrometer in a β-γ-coincidence experiment for the first time. The shape factor has been determined:

$$C(W) = 1 - 0.394\,W - 0{,}275\,W + 0.044\,W^2.$$

The Spin and Parity of the ground state of ^{146}Pm can be determined to be 3^-.

The shape of this non-allowed spectrum indicates the existence of the "cancellation" or "selection rule" effect.

H. Krüger, O. Lutz, A. Schwenk, and G. Stricker, Physikalisches Institut der Universität Tübingen, Germany:

Nuclear Magnetic Resonance Studies of ^{111}Cd

The ratio of the Larmor frequencies of ^{111}Cd and ^{2}H has been measured in an aqueous solution of $CdSO_4$ with high accuracy. ^{111}Cd chemical shifts have been investigated in aqueous solutions of $CdCl_2$, $Cd(NO_3)_2$, $CdSO_4$, and $Cd(ClO_4)_2$ as a function of concentration. Using these, the ratio of the Larmor frequencies of the ^{111}Cd nuclei for infinite dilution relative to ^{2}H in pure D_2O is given. From this a g_I-factor for ^{111}Cd has been derived and has been compared with the g_I-factor of an optical pumping experiment. The resulting shielding constant is

$$\sigma^{*}\ (\text{hydrated } ^{111}\text{Cd versus } ^{111}\text{Cd atom}) = -1.106(4)\cdot 10^{-3}.$$

This yields an atomic reference scale for all measured NMR line shifts in the liquid and solid state and the possibility of comparing experimental and theoretical shielding constants. As a consequence, the amount of the Knight shift of metallic cadmium becomes 20% larger.

J. Halbritter, Institut für Experimentelle Kernphysik, Universität und Gesellschaft für Kernforschung, Karlsruhe:

On Surface Resistance of Superconductors

In principle, the surface resistance of superconductors for RF can be calculated in the framework of the BCS-theory. However, even in the simplest case (low rf field strengths and Meissner phase), the theory yields complicated expressions, which need a computer for solving; the results are shown as graphs. To avoid the use of these complicated expressions, we discuss these numerical results in a model which allows an understanding of the unusual dependencies on the material parameters of superconductors.

The theoretical results are compared with new experiments on Nb and on alloys showing, that the surface resistance of superconductors give additional information on the superconducting material in the penetration region.

H. Voit, P. Dück, W. Galster, E. Haindl, G. Ischenko, and F. Siller, Physikalisches Institut der Universität Erlangen-Nürnberg, Erlangen, Germany:

Selective Population of the Lowest-Lying Negative Parity States in ^{23}Na in the $^{12}C(^{12}C, p)^{23}Na$ Reaction

The $^{12}C(^{12}C,p)^{23}Na$ reaction was investigated in the vicinity of the Coulomb barrier. The lowest-lying negative parity states in ^{23}Na were found to be preferentially populated at energies for which correlated resonances exist in the excitation functions of the α, p, n and γ exit channels of the $^{12}C+^{12}C$ reaction. If these negative parity states are assumed to consist of a $p_{1/2}$ hole coupled to a ^{20}Ne quartet state, this selectivity can be explained with the existence of α-particle doorway states.

A. A. C. Klaasse and P. F. A. Goudsmit, Institut voor Kernphysisch Onderzoek, Amsterdam, The Netherlands:

The Decay of ^{63}Zn

Energies and relative intensities of γ-ray transitions in the decay of ^{63}Zn have been measured with a Ge(Li) spectrometer in an anti-Compton anti-annihilation set up. Gamma-gamma coincidences and the "energy level spectrum" have been measured. Some aspects of the resulting decay scheme are compared with existing theoretical predictions.

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$a, b, c, d, e, f, g, h, i, j, k, l, m, n, o, p, q, r, s, t, u, v, w, x, y, z$

blue = Gothic:

$\mathfrak{A}, \mathfrak{B}, \mathfrak{C}, \mathfrak{D}, \mathfrak{E}, \mathfrak{F}, \mathfrak{G}, \mathfrak{H}, \mathfrak{I}, \mathfrak{J}, \mathfrak{K}, \mathfrak{L}, \mathfrak{M}, \mathfrak{N}, \mathfrak{O}, \mathfrak{P}, \mathfrak{Q}, \mathfrak{R}, \mathfrak{S}, \mathfrak{T}, \mathfrak{U}, \mathfrak{V}, \mathfrak{W}, \mathfrak{X}, \mathfrak{Y}, \mathfrak{Z}$

$\mathfrak{a}, \mathfrak{b}, \mathfrak{c}, \mathfrak{d}, \mathfrak{e}, \mathfrak{f}, \mathfrak{g}, \mathfrak{h}, \mathfrak{i}, \mathfrak{j}, \mathfrak{k}, \mathfrak{l}, \mathfrak{m}, \mathfrak{n}, \mathfrak{o}, \mathfrak{p}, \mathfrak{q}, \mathfrak{r}, \mathfrak{s}, \mathfrak{t}, \mathfrak{u}, \mathfrak{v}, \mathfrak{w}, \mathfrak{x}, \mathfrak{y}, \mathfrak{z}$

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$7/8, (a+b)/c$	$\frac{7}{8}, \frac{a+b}{c}$	f^{-1}	$\bar{f}^{1}$

Quasielastic Neutron Scattering for the Investigation of Diffusive Motions in Solids and Liquids

By Professor Dr. **Tasso Springer,** Institut für Festkörperforschung der Kernforschungsanlage Jülich

With 36 figures. II, 100 pages. 1972
(Springer Tracts in Modern Physics/ Ergebnisse der exakten Naturwissenschaften, Vol. 64)
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Inhalt

5. (Schluß-)Heft

Überwiegend Arbeiten aus den Gebieten der Kern- und Elementarteilchenphysik

Park, J. Y.: Shell-Model Analysis of Helion and Triton Inelastic Scattering from ^{90}Zr Including Core Polarization Effects 355

Smith, A. B., Guenther, P. T., Whalen, J. F.: Neutron Total and Scattering Cross Sections of Niobium in the Continuum Region 379

Zielińska-Pfabé, M., Stępień-Rudzka, W.: Influence of the Quadrupole-Pairing Interaction on the $J\pi=0^+$ Vibrations in the Pt Region 399

Mantzouranis, G.: Direct and Compound Contributions to (n, γ) Cross Sections 405

Ebenhöh, H., Eisele, F., Filthuth, H., Hepp, V., Leitner, E., Thouw, T., Zech, G.: Measurement of Radiative $\Sigma\pm \rightarrow n\pi\pm\gamma$ Decay 413

De Waard, H., Kaufmann, E. N., Rodgers, J. W.: Perturbed Angular Correlation Measurement of the g-Factor of the 668 keV State in ^{132}Xe 423

Dilg, W., Mannhart, W., Steichele, E., Arnold, P.: Precision Neutron Total Cross Section Measurements on Gold and Cobalt in the 40 μeV–5 meV Range . . 427

Indexed in Current Contents

Neu eingegangene Arbeiten am Schluß des Heftes

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